

PROGRAMMING 2764 (8K x 8) and 27128 (16K x 8) EPROMs

(for TIMEX-2068 Programs Written in BASIC Only)

Using the John Oliger Co. 2068 EPROM Programmer
and 2068 User Cartridge Boards

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CAUTION

Since these EPROMS can be easily damaged irreparably by static electricity, they must be handled very carefully.

PRELIMINARY PREPARATIONS

Key in each of the three EPROM LOADER programs listed on page 4 and SAVE on tape. These LOADER programs will be used for programming the EPROMS by MERGING them with the BASIC program. Although these programs can be keyed in manually each time they are used, SAVED versions will prove much more practical by simplifying the programming process and by eliminating keyboard input errors.

SEQUENTIAL CHECKLIST

1. Both Computer & Vpp Supply are OFF; Vpp switches set for "4.4v" and "21v" (if "21v-25v" switch is set for 25v instead of 21v, the EPROM will probably be ruined later when the "4.4v-Vpp" switch is switched to "Vpp").
2. Plug the appropriate type of EPROM into the the EPROM Programmer Board. The EPROM must be new or erased. See paragraph 9 below to estimate the type(s) of EPROM(s) to use and whether one or two EPROMS will be required. Refer to page 10 of the Programmer owner's manual for a method to verify EPROM erasure.
3. Set Programmer Board Select Switch to "64" for 2764 EPROMs and "128" position for 27128 types.
4. Plug Programmer Board into the 2068 Expansion Board, plug Expansion Board into the rear expansion connector of the 2068, and connect Programmer Vpp power leads to the two power terminals on the Programmer Board. Be sure to observe proper polarity.
5. Turn 2068 computer power switch "ON".
6. Again check to be sure that the Programmer Vpp switches are still at their "4.4" and "21" volt positions and then plug in the Vpp Power Supply.

7. LOAD and EDIT Basic program; delete all REMs and any other superfluous statements. Any "DEF FN" and "FN" statements must be deleted. Since program lines higher than 9979 would conflict with the LOADER program(s), they must be renumbered to lower values; this may require revision of some earlier program statements, if they are adversely affected by any of the renumbered lines.

8. <CLEAR> <ENTER>

9. <PRINT PEEK 23627 + PEEK 23628 * 256> <ENTER> & write down this number, minus 1; this number will be referred to below as the "Nr".

NOTE: After referring to the criteria below, if it is determined that the type EPROM installed in Step 2 above must be changed to the other type, then unplug the Vpp Supply, switch OFF the computer, remove the Vpp power leads, unplug the Expansion and Programmer Boards, change the EPROM and start over, reverting back to Step 3 above.

a. If the Nr is 34893 or less, then use one 2764 and MERGE LOADER Program "A" with the edited Basic program. Edit line 9994 to replace "XXXX" with the Nr written down.

b. If the Nr is more than 34893 but less than 43096 then use two 2764 EPROMS; or, if the Nr is less than 43086 one 27128 can be used instead (two 2764s should be a little less expensive than one 27128 but require two programming runs instead of one).

(1). If two 2764s are used, MERGE LOADER Program "A" for both EPROM programming runs and edit as follows:

(a). Run #1: Edit line 9994 to replace "XXXX" with "34893".

(b). Run #2: Edit line 9994 to replace "26710" with "34894" and "XXXX" with the Nr written down.

(2). If one 27128 is used, MERGE LOADER program "B" and edit line 9999 to replace "XXXX" with the Nr written down.

c. If the Nr is more than 43095 but less than 51278 then use two 27128s; or (to save \$), a 27128 for the first run and an 2764 for the second.

(1). If 27128s are used, MERGE LOADER program "B" for the first run and "C" for the second. Edit as follows:

(a). Run #1 (Program "B"): Edit line 9999 to replace "XXXX" with "43085".

(b). Run #2 (Program "C") : Edit line 9999 to replace "26710" with "43086" and "XXXX" with the Nr written down.

(2). If a 27128 and a 2764 are used, MERGE LOADER program "B" for the first run and "A" for the second. Edit as follows:

(a). Run #1 (Program "B"): Edit line 9999 to replace "XXXX" with "43085". Use the 27128 for this run.

(b). Run #2 (Program "A"): Edit line 9994 to replace "26710" with "43086" and "XXXX" with the Nr written down. Use the 2764 for this run.

d. If the Nr is more than 43095 but not more than 59469 than two 27128s must be used (if the number is more than 59469 then the two EPROMS can not hold the program as written). MERGE LOADER program "B" for the first run and "C" for the second. Edit as follows:

(a). Run #1 (Program "B"): Edit Line 9999 to replace "XXXX" with "43085".

(b). Run #2 (Program "C"): Edit line 9999 to replace "26710" with "43086" and "XXXX" with the Nr written down.

10. After editing has been completed, key in and <ENTER> one of the following (as appropriate), with NO line numbers. In each case, after <ENTER>, the EPROM programming process will begin; maximum programming times will take from about 10 to 30 minutes, depending upon the type EPROM being used and program length:

a. For EPROM LOADER program "A": switch Vpp power switch from "4.4v" to "Vpp" (21 volts) and then <GOTO 9990> <ENTER>.

b. For EPROM LOADER program "B": <LET p=9980: Let data=9988> <ENTER>, switch Vpp power switch from "4.4v" to "vpp" (21 volts) and then <GOTO p> <ENTER>.

c. For EPROM LOADER program "C": <LET p=9990: LET data=9999: LET dest=0: LET one=1: LET three=3> <ENTER>, switch Vpp power switch from "4.4" to "Vpp (21 volts) and then <GOTO p> <ENTER>.

11. When the programming process has been completed (as indicated the screen display report code), switch the Vpp power back to "4.4" volts, and then after a short pause unplug.

12. Downpower the 2068, disconnect the Vpp power leads, unplug the Expansion and EPROM Programmer Boards, and then remove the EPROM (remember to treat the EPROM with very TLC!). The EPROM should feel very warm to the touch---if cold, then for some reason it probably did not "take", or program properly-----or may even prove to be defective if the proper voltages were used and procedures followed (erase the EPROM and give it another try!).

13. If a second EPROM "burn" is required, install the other EPROM in the EPROM Programmer Board and continue-----again using the above checklist as a guide. The type EPROM to be used will have been determined by the criteria already established above in paragraph 9-----while preparing for the first "burn".

14. The EPROM(S) is/are now ready for use. Before plugging the EPROM(S) into the User Cartridge Board, be sure the board is configured properly----wire jumpers for 2764s and diode jumpers for 27128s).

15. After plugging in the User Cartridge and turning on the 2068, the EPROMed program should run immediately--with no "load" time involved whatsoever. If the cartridge does not run, then a procedural error has been made, or/and a defective EPROM was used, or/and the cartridge itself was not "jumped" properly for the type EPROM(s) being used. If difficulty is encountered, then carefully review the relevant programming procedures, check the cartridge jumper configuration, and use new (or erased) EPROM(s) for a second attempt.

EPROM LOADER PROGRAMS
(to be SAVED on Tape)

EPROM LOADER PROGRAM "A"

```
9990 LET x=8192
9991 RESTORE 9993: FOR n=1 TO 8: READ z: POKE x,z
9992 PAUSE 4: LET x=x+1: NEXT n
9993 DATA 1,2,8,128,15,1,0,0
9994 FOR n=26710 TO XXXX
9995 POKE x,PEEK n: PRINT AT 10,11;n
9996 LET x=x+1: PAUSE 3: NEXT n
9997 BEEP 1,1
```

EPROM LOADER PROGRAM "B"

```
9980 RESTORE data: READ dest: READ one: READ three: READ eight:
READ next: READ data
9982 READ z: POKE dest,z: LET dest=dest+one
9984 PAUSE three
9986 IF dest<eight THEN GO TO next
9988 DATA 0,1,3,8,9982,9999
9989 DATA 1,2,8,128,15,1,0,0
9990 RESTORE data: READ src: READ end: READ loop: READ line: REA
D col
9992 POKE dest,PEEK src
9993 PAUSE three
9994 LET src=src+one
9995 LET dest=dest+one
9996 PRINT AT line,col;dest
9997 IF src<=end THEN GO TO loop
9999 DATA 26710,XXXX,9992,10,13
```

EPROM LOADER PROGRAM "C"

(Same as Program "B", but with lines 9980 thru 9989 DELETED)